

NOTES ON THE FAUNA OF DIRK HARTOG ISLAND,
WESTERN AUSTRALIA.

No. 1.—INTRODUCTION.

By EDWIN ASHBY, F.L.S., M.B.O.U., etc.

[Read June 13, 1929.]

Dirk Hartog Island is the most westerly land in the continent of Australia, is 50 miles in length by a width of 4 to 8 miles, and forms with Dorre Island and Bernier Island to the north, the western barrier of Shark Bay, sheltering its waters from the heavy western swell of the Indian Ocean.

On October 25, 1616, Dirk Hartog, a Dutch navigator, landed on the northern end of the island at Cape Inscription, where he nailed to a post a plate upon which was inscribed his name, the date of his landing, and the name of his vessel. In 1697 Willem de Vlaming visited the same spot, took down Hartog's plate, replacing it with his own, and ultimately depositing the original in the State museum at Amsterdam, where it is now preserved.

On August 1, 1699, the British navigator, William Dampier, anchored in Shark Bay and spent eight days searching for water, and from there took home to Europe a few botanical specimens, one of which has been named after him, *Diplolaena dampieri*. But it is to the French expedition, of which the ship "Uranie," under the Captain Mons. de Freycinet, which anchored in Shark Bay in September, 1818, that we are indebted for the first investigation of the fauna of Dirk Hartog Island. One of the surgeons of the expedition, Mons. Quoy, landed on the Island and, as a result of his collecting, the Black and White Wren that is endemic to Dirk Hartog Island and Barrow Island was described. A century passed by before that island was again visited by a competent ornithologist. In 1916 Mr. Thomas Carter spent two or three months collecting there, partly in the early winter and again in late spring; he re-discovered the Black and White Wren, whose very existence had been doubted for almost a hundred years, and he also described several very interesting subspecies that are endemic to the island. Then in 1918 and 1920, Mr. F. Lawson Whitlock paid two fairly lengthy visits to the island, adding thereby to our knowledge of its avifauna.

On the conchological side, in 1905, Drs. Michaelsen and Hartmeyer, in the interests of the Hamburg South-West Australian Expedition, did a good deal of collecting in Shark Bay, and in 1911 Dr. J. Thiele described the chitons collected by them; of the seven then described as new, several were from Shark Bay. The types of these are in the Berlin Museum, and hitherto only one of the seven has been represented in any Australian collection.

The two main objects of the writer's visit was to study and collect the specialized avifauna of Dirk Hartog Island and to collect examples for Australian collections of some of Thiele's new species of chitons. In both of these directions the expedition was largely successful. My colleague, Dr. A. Chenery, and myself had planned to give a week or ten days to the island, but owing to the unfortunate stranding of the steamer that calls in at Shark Bay, my time was reduced to four clear days, September 24 to 27, 1927. Dr. Chenery was able to stay a few more days, but I had to catch the motor mail at Carnarvon to keep another appointment. During our stay we were generously entertained by Mrs. and Major Chenery who are part owners of the Dirk Hartog sheep station, and I gladly take this opportunity of expressing my thanks, and also acknowledge our indebtedness to the Chief Inspector of Fisheries (Mr. Aldrich) of Perth, and Mr. Walter Edwards, the Fisheries Inspector stationed at Shark Bay, who both

showed us many kindnesses. The rocks are limestone or coral, both unsuited to *Polyplacophora*, and the chiton fauna was numerically very poor. Examples of some of the species collected were sent to Dr. J. Thiele, of Berlin, to compare with his types, and extracts of his replies are quoted herein.

The rainfall of the island is about 12 inches. Trees are quite absent, but extensive areas are covered with low "scrub," some of the larger bushes reach a height of 15 feet; representatives of the Leguminosae, Myrtaceae, Proteaceae, Malvaceae and other families were noticed in this scrub, and many of them were very showy when in flower, but the genus *Eucalyptus* was represented by only a few meagre patches of dwarf mallee-like forms. There was a large variety of herbaceous and annual plants, which together with many of the bushes are found to be excellent sheep feed.

Thomas Carter's paper, "The Birds of Dirk Hartog Island: 'The Ibis'" (vol. v., No. 4, pp. 564-611, 1917), and F. Lawson Whitlock's paper, "Notes on Dirk Hartog Island: 'The Emu'" (vol. xx., pp. 168-189, Jan., 1921), both furnish maps and are exceedingly interesting and informative. The notes under the heading "Aves" are the combined observations of Dr. A. Chencry and the writer. The mollusca collected, other than chitons, were handed over to the South Australian Museum, and the following coleoptera also were handed over to the same museum and identified by Arthur M. Lea.

COLEOPTERA.

SCARABAEIDAE.

Haplonycha crassiventris Blanch.

Bolboceras insigne Lea.

Two examples of each of these came to light at the homestead, Dirk Hartog Island. Mr. Lea states that both these species are very desirable ones, only known by very few examples. Of the former only two examples have hitherto been known, the type being in the Paris Museum and the other in the Blackburn Collection, labelled as having come from Lake Austin, Western Australia.

CHRY SOMELIDAE.

Paropsis hemisphaerica Chp.

Paropsis niobe Blackburn.

MOLLUSCA.

A number of shells were collected by the writer, and it was intended to publish the record as a separate paper, but they have unfortunately been absorbed into the Muscum Collection, with the exception of a member of the Fissurellidae belonging to the genus *Eligidion*, this is being described by Mr. B. C. Cotton, Assistant Conchologist of the South Australian Museum, to which Museum all the coleoptera and mollusca collected (except chitons) have been presented by the writer.

INDO-AUSTRALIAN FAUNAL REGION.

Ashby, in "The Regional Distribution of Australian Chitons" (Report Aust. Assn. Adv. Sci., vol. xvii, pp 366-393, 1924), proposed a new Faunal Region, based on the influence of a warm current that is shown by Haligan to come in from the Indian Ocean and impinge on the coast of Australia at Shark Bay (of which bay Dirk Hartog Island forms part of the western rampart), this current then flows down the west coast, turning at Cape Leeuwin in an easterly direction and flowing along the southern coast of the Australian Continent over the cold and heavier western or antarctic current. Haligan supplies data to show that the

temperature of the surface water is raised appreciably by this current as far as Cape Northumberland on the eastern border of the State of South Australia. The limited evidence that it was possible to obtain during this expedition, certainly, from the point of view of the *Polyplacophora*, supports the acceptance of the proposed Indo-Australian Faunal Region.

The two open ocean species of chiton, both common and endemic to the State of Western Australia, appear to reach their northern limit in the north of Shark Bay, and one of the commonest ischnochitons in South Australia is also the commonest ischnochiton on the rocks on the sheltered side of Dirk Hartog Island but has not been recorded from further north, and its extreme limit eastward is found on the northern coast of Tasmania.

NOTES ON THE FAUNA OF DIRK HARTOG ISLAND, WESTERN AUSTRALIA.

No. 2.—AVES.

(Including joint observations of Dr. A. Chenery and the writer.)

PIED CORMORANT (*Phalacrocorax varius* Gmelin, 1789.)

Nesting in great numbers on Quoin Bluff, on the ledges in the limestone cliffs; young almost fully fledged.

AUSTRALIAN PELICAN (*Pelecanus conspicillatus* Temminck, 1824).

Only a few birds seen.

RED-TAILED TROPIC BIRD (*Phaethon* (?) *rubricaudus* Boddaert, 1783).

I saw a Tropic Bird some miles out at sea and some distance south of the island, the light was not good enough to enable one to distinguish the colour of the long tail feathers but I concluded that it was the red-tailed species; as it was noticed several times, there may have been more than one bird.

The following twelve species only need be recorded:—Crested Tern (*Sterna bergii*), Fairy Tern (*Sterna nereis*), Silver Gull (*Larus Novaehollandiae*), Pacific Gull (*Gabianus pacificus*), Pied Oystercatcher (*Haematopus ostralegus*), Banded Plover (*Zonifer tricolor*), Eastern Curlew (*Numenius cyanopus*), (?) Whimbrel (*Numenius phaeopus*), Red-necked Stint (*Erolia ruficollis*), Sharp-tailed Stint (*Erolia acuminata*), Australian Bustard (*Eupodotis australis*).

REEF HERON (*Demigretta sacra* Vieillot, 1817).

Both the dark and the white forms were noted.

WEDGE-TAILED EAGLE (*Uroaetus audax*, Latham, 1801).

WHITE-BREADED SEA-EAGLE (*Haliaeetus leucogaster* Gmelin, 1788).

NANKEEN KESTREL (*Falco cenchroides* Vigors and Horsfield, 1827).

OSPREY OR FISH-HAWK (*Pandion haliaetus*, Linne, 1758).

Several pairs of these birds were seen. One pair had made their nest, consisting of almost a cart-load of sticks, on the summit of a small conical hill, locally known as "Monkey Hill," near Surf Point, the southern extremity of the island; in the nest were two fledglings with wing feathers well developed; the parent

birds continued to make loud cries as long as one was within the neighbourhood of the nest; it was a very fine sight to see these splendid birds circling round and round overhead, sometimes swooping down within fifty feet of the spectator.

HORSFIELD BRONZE-CUCKOO (*Chalcites basalis* Horsfield, 1821.)
One specimen collected by Dr. Chenery.

WELCOME SWALLOW (*Hirundo neoxena* Gray, 1842).
These birds were nesting at the Homestead.

WHITE-FRONTED CHAT (*Epthianura albifrons* Jardine and Selby, 1828).
One nest found on a samphire-flat containing three eggs.

THE DIRK HARTOG SCRUB-WREN (*Sericornis balstoni* Grant, 1909).
Sericornis balstoni Grant (Bull. B.O.C., 23, 72, 1909, Bernier Is.).
Sericornis maculatus hartogi Carter (Bull. B.O.C., 37, 6, 43, 1916, Dirk Hartog Is.).

In September, 1928, I left my skins from Dirk Hartog Island in Melbourne for Mr. A. G. Campbell to examine, stating that at a meeting of the South Australian Ornithological Association we had come to the conclusion on the skins we had before us (two collected by Dr. Chenery and two by myself), that the Dirk Hartog *Sericornis* was worthy of being given full specific status. Mr. Campbell wrote me under date September 15, 1928:—"Mr. Ashby's skins of *Sericornis* agree with those in the H. L. White collection from Dirk Hartog Island and Bernier Island. These are distinct from *Sericornis maculatus* and are being kept so in the forthcoming biographies. Distinguishing marks are, pallid back; white ground to under-surface including under wing coverts; tail tips white all round." To this I would add that in the four examples collected, the anterior portion of the superciliary white line, common to the members of the genus *Sericornis*, is in these skins so broadened and the lores so pale as to make the lores white to dirty-white, a feature previously unknown in the genus *Sericornis*. One of the examples is a male with almost white lores. This led us to conclude that this peculiar feature was common to both sexes, but when passing through Melbourne I had the privilege of glancing through the skins in the "White Collection" and noticed there some of adult males in which the lores were darker, although still quite distinct from *S. maculatus*. I have no skins from Bernier Island, but feel justified in accepting Mr. Campbell's statement that they are conspecific with the bird on Dirk Hartog Island. Grant's name antedates that of Carter's. I have an example of Mellor's *S. m. geraldtonensis*, taken by myself at the same time and place as the holotype; this differs widely from the Dirk Hartog bird, but seems nearer that species than is the dark form of *S. maculatus* from the south-western corner of the western State.

This striking insular species was common in all places visited, it is quiet and mouse-like in its movements, but if one is still in any locality where are thick bushes, and make a few lip calls, these little birds will be seen creeping about in the shelter of the bush, coming out first in one place and then in another to have a look, often, as noticed by Carter, making a scolding note, evidently taking umbrage at the intruder.

THE DIRK HARTOG ISLAND ROCK FIELD WREN (*Calamanthus montanellus hartogi* Carter, 1916).
C. campestris hartogi Carter, Bull. B.O.C., 37, 6, 1916.

This is another of Carter's finds and is a very striking insular form nearest to *C. montanellus* Milligan, but the streaking is darker and narrower, both in

upper and lower plumage; but it differs from that species, and also from *C. campestris* and *C. isabellinus*, in the absence of rufous and buff colouration in either upper or lower plumage, and in that the ground colour of the under-side is white.

This bird was much more local than the *Sericornis*, but in the clumps of bushes where it did occur it was numerous. The male birds, in common with the allied forms on the mainland, have a very sweet song, which is produced from exposed positions on the tops of bushes, disappearing into the bush while the intruder is still a good way off; when moving in the bushes or running from one bush to another, along the ground, they cock their tails. The two I made skins of were both males, in one the iris is recorded as yellow, in the other "very pale straw colour."

DIRK HARTOG ISLAND EMU WREN (*Stipiturus malachurus hartogi* Carter).

S. m. hartogi Carter, Bull. B.O.C., 37, 6, 1916.

As compared with the Emu Wren of the mainland this subspecies is a dwarf, in fact in respect to size it seems closer to *S. ruficeps* Campbell; but in that species in the male the blue of the throat extends right round the eye and side of face, whereas in all the forms of *S. malachurus*, in the male, the feathers below the eye and side of face are never blue. The female differs widely from any other form in the pale silvery-grey ground-colour of the upper plumage, this is especially marked on the head and neck; a reference to Carter's colour plate (*Ibis*, 1917, pl. xi.) will show almost the correct tone of grey, but the proportion of grey to the dark streaking should be reversed, namely two of grey to one of black; the under-side of this island form is a much paler shade of buff than any mainland form. The tail of a female in my collection is even longer than that of the male, figured in Carter's plate. The full measurements of this skin are:—Total length, including tail, 150 mm.; length from tip of beak to base of tail, 50 mm.; tail, 10 mm.; wing, 39 mm.; culmen, 10 mm.; tarsus, 20 mm.; colour of iris, dark walnut; tarsus and feet, pale brown; bill, grey-black upper, horn lower. This species was first noted nearly 20 miles north of the homestead in low bushes, not far from the eastern shore of the island, but was again met with on the wind-swept downs on the western side of the island, immediately above the cliffs which there are several hundred feet in height, the great ocean rollers of the Indian Ocean breaking ceaselessly at their base. The surface of the rolling downs above is largely covered with a dwarf myrtaceous shrub which I took to be a *Thryptomene*, this dwarf shrub taking much the same place here that the heaths (*Erica* and *Calluna*) do on the moors of the British Isles. This Emu Wren shelters in these shrubs, is very shy and retiring and difficult to locate or flush, when flushed it flies with feeble flight in a straight line, its long tail held horizontally behind. We secured several females and one male, but as Whitlock failed to secure a male during his two collecting trips to the island, it is evident that the male is even more shy than the female.

THE BLACK AND WHITE WREN (*Malurus leucopterus* Dumont, 1824).

M. leucopterus Dumont, Dict. Sci. Nat., 30, 118, 1824.

As stated in the introduction, the type of this species was taken on Dirk Hartog Island by Mons. Quoy in 1818. While this Wren is apparently present throughout the length and breadth of the island, owing to its retiring and shy habits it requires searching for. The first example I personally saw was on September 24, when a company of these little birds was noticed in some bushes on the sandhills bordering the South Passage at the southern extremity of the island, less than half a mile from Surf Point; the width of the channel here separating the island from the mainland is stated by Carter to be "barely a mile."

As neither Carter or Whitlock seem to have done any collecting on this southern end of the island, this observation, so near to the mainland, is of importance; there is no doubt as to the identification, for one or more of the black and white males were easily seen in this small flock.

To the north and west of the homestead we saw many birds and secured a nice series of skins. At one point near the eastern shore several cock birds, with the attendant females, were noticed in low bushes growing on small hillocks of sand, separated from one another by sapphire flats. Then again, I noticed several males well up on the elevated western downs bordering the Indian Ocean. The population of Black and White Wrens on this island must run into scores of thousands; the "cats gone wild" mentioned by Whitlock, I am thankful to say, do not seem in any degree to have diminished the numbers of this extremely interesting form of *malurus*.

Habits.—As before mentioned, these birds go in companies containing a number of females and young males, in plain brown upper plumage and almost white under, with one or more adult males dressed seemingly, entirely in black and white, except the tail feathers which are deep blue. These adult males are very shy but have the habit of perching upon the topmost branches of the bush they happen to be in, and watching the intruder at a distance, or if disturbed when the intruder is nearer, they quickly disappear into the shelter of the bush, making their exit near the ground on the opposite side and thus passing through bush after bush if small, or remaining hidden if a large bush; in fact, they are adepts at doing a sort of disappearing trick; it requires the greatest vigilance of the observer if he is to keep in touch with the bird at all. It was also noted that the black plumage is inconspicuous except when the observer is quite near, and the pure white wing coverts are also invisible except when seen against a dark background. The plain plumaged birds, to a certain extent, scatter when disturbed, but whether this is due to any warning call of the male or not I could not ascertain.

Description.—None of the cock birds collected by us show any blue except in the tail, the pure white wing patch is made up, according to Mathews, of "inner upper wing coverts, scapulars, upper-back, and innermost secondary quills"; the flight quills are brown and rest of both upper and under plumage is intense black, but the crown of the head has a distinct sheen-like satin. The measurements and data of a male were made in the flesh. Total length, tip of beak to tip of tail, 120 mm.; wing, 41 mm.; tail, 57 mm.; culmen, 9.5 mm.; tarsus, 21 mm.; iris, brown; feet, dark horn; tarsus, horn colour; bill, black. In the female the bill is reddish-horn; iris, feet and tarsus, same as male.

Discussion.—Several theories have been proposed to explain the existence on both Dirk Hartog Island and Barrow Island, separated, as they are, by 400 miles of sea, of a Black and White Wren endemic to these two islands and occurring nowhere else. Are they survivals of a primitive form which has disappeared on the mainland, or are they, as I believe, representatives of a mainland species that has, owing to special ecological conditions common to these two widely-separated islands, changed in its plumage from deep blue and white to black and white. In advancing this hypothesis, I am able to advance some data from my own collection which has encouraged me to propound this theory as against that of survival.

I have in my collection skins of three males from different localities on the mainland of Western Australia of the Blue and White Wren (*M. cyanotus* Gould, 1865), all show a much deeper blue than do examples from South Australia. One, from the coast hills 160 miles north of Perth, shows many almost black feathers intermingled with the blue, and a male I collected on Peron Peninsula on September 29, 1927, 300 miles further north than the preceding example, is

so dark in colour that it looks black in some lights; in fact, I have several times picked up this skin thinking it was one of the Dirk Hartog Island specimens, until I altered the angle of light. It will be noted that only 20 miles of water separate the two localities.

As before stated, barely a mile of water separates the island at its southern extremity from the mainland, it seems almost certain that gales will at times drive the Blue and White Wren from the mainland to the island or the island bird on to the mainland. In face of the evidence advanced which indicates a gradual transition from lighter blue to darker in the western examples of *M. cyanotus*, evidences that this tendency is emphasised as one proceeds northwards along the coastal belt, we are surely justified in assuming that this melanote tendency attains its maximum development on the two islands named owing to the presence there in excess of the inducing cause or causes. It is interesting to note that the females of the two species are practically identical.

THE DIRK HARTOG ISLAND PURPLE-BACKED WREN (*Malurus assimilis hartogi* Mathews, 1918).

Malurus lamberti hartogi Mathews, Bull. B.O.C., 39, 24, 1918.

Several examples of both male and female were secured; their plumage is exceptionally brilliant, the blue around the eye and cheek is a little different in shade from any examples I have seen from South Australia, and in this subspecies this shade of blue extends along the margin of the crown. I notice that Carter identified his specimens from Dirk Hartog Island with the subspecies *occidentalis* Mathews, 1912. Not having seen examples of *occidentalis*, I cannot express an opinion as to whether Mathews was justified in separating it, nevertheless, recognising that the insular bird warrants subspecific separation from the South Australian, I accept Mathews' name, *hartogi*. We found these Wrens shy, but noted them in several localities a good many miles apart.

WESTERN SILVEREYE (*Zosterops australasiae* Vieillot, 1817).

Sylvia australasiae Vieillot, Nouv. Dict., 11, 235, 1817.

These birds were very numerous on the island and may be presumed to represent Mathews' subspecies *edwini* from Carnarvon, only 80 miles to the north-east. In the two examples we collected on the island, I cannot note any differences from skins taken from the mainland further south.

BROWN HONEYEATER (*Gliciphila indistincta* Vig. and Hors., 1827).

Only seen at 12-mile well, where Carter camped.

SINGING HONEYEATER (*Meliphaga virescens* Vieillot, 1817).

Melithreptus virescens Vieillot, Nouv. Dict., 14, 329, 1817, Shark Bay, W.A.

This was much the commonest bird on the island. We did not collect any specimens on the island but did collect several on Peron Peninsula, just 20 miles across the water. It is understood that the type described by Vieillot was taken on the same peninsula. I notice that Mathews, in 1920, separated the bird on the island under the subspecific name *hartogi*, but such a strong flying bird is not likely to have been isolated from the mainland.

THE AUSTRALIAN PIPIT (*Anthus australis* Vieillot, 1818).

These birds were fairly common, but one example only was taken; this skin does not exhibit any features separating it from the mainland birds, which from

the same localities show a fairly wide margin of variation; I am, therefore, not adopting Mathews' subspecific name of *hartogi*.

ZEBRA FINCH (*Taeniopygia castanotis*).

This species was common at the wells, but one example only was collected on the island; the same species was also numerous on Peron Peninsula, but I cannot note any characters distinguishing examples I secured there and on the Murchison from the form we have in South Australia, so am not making use of Mathews' name *hartogi*.

LITTLE CROW (*Corvus bennetti*) (?).

We did not collect any specimens on the island, and therefore the identification of the island bird with this crow is uncertain. As there are no trees on the island, the crows we saw were nesting on most of the windmills.

NOTES ON THE FAUNA OF DIRK HARTOG ISLAND,
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No. 3.—POLYPLACOPHORA.

ACANTHOCHITON BEDNALLI JOHNSTONI Ashby.

Acanthochiton bednalli, var. *johnstoni*, Ashby (Trans. Roy. Soc. S. Austr., vol. xlvii., p. 231, 1923).

This shell was described by the writer as a variety of *A. bednalli*, from three examples that were collected by W. C. Johnston at about half way between Carnarvon and Maud Landing; I now suggest treating this western form as a subspecies.

Definition.—Differs from *A. bednalli* s.s., in that the dorsal area in this form, from the beak forwards for about half the length, is ornamented with longitudinal rows of elongate, squamose granules, which then for a short distance in some examples shows a little longitudinal grooving which is replaced by a smooth surface, except for transverse growth ridges. The consistent deep longitudinal grooving, that is so typical of *bednalli*, is in this form absent; also, the fringe spicules of the girdle are decidedly coarser than *bednalli* s.s. This description is made from an example collected by the writer at Woodman's Point, near Fremantle, because the type from North of Carnarvon had the dorsal area eroded, this example now becomes the neotype.

Two juvenile examples were obtained on rocks, at low tide, four miles south of the homestead on the island. The smaller, which measures only 3 mm. in length, possesses such a broad dorsal area that it is with hesitation that the writer assigns it to this species, but the larger, which is curled and measures about 5 mm. in length, seems quite typical of this subspecies.

NOTOPLAX SUBVIRIDIS Torr.

Acanthochites subviridis Torr (Trans. Roy. Soc. S. Austr., vol. xxv., p. 104, 1911).

One example in excellent preservation, measuring, dry, 12.5 mm. in length, was obtained four miles south of the homestead, it is a typical specimen. The occurrence of this rare *Notoplax* at Dirk Hartog Island extends our knowledge of its range of habitat nearly 600 miles northwards. The only previous records were the four specimens collected by Torr at Albany, 1910, and three by the writer at Yallingup in 1929.

ISCHNOCHITON CARIOSUS Pilsbry, 1892.

Iredale and Hull make Dall the author of the name *cariosus*, but as far as I can ascertain this name as used by Dall was a *nomen nudum*, in which case the author is Pilsbry, 1892.

The action of Iredale and Hull in giving generic rank to the name *Heterozona* has not up to the present been justified by any definitions supplying distinctions of generic status. Pilsbry (Man. Con. xiv., p. 65) treated *Heterozona* as a subgenus of the genus *Ischnochiton*, proposed by Dall, 1873 (Table of Regular Chitons, 1873), Pilsbry accepting the name as of subgeneric value on account of the "girdle bearing small scales with large striated scales intermingled," but later, in vol. xv., p. 82, he treats the name *Heterozona* as a section of the genus *Ischnochiton* only.

As the two other species which Iredale and Hull include in their genus *Heterozona*, namely *I. fruticosus* and *I. subviridis*, neither possess the character of "intermingled large girdle scales," such treatment is without justification. The main character on which Pilsbry's section *Heterozona* was founded, "the intermingling of large scales," seems to be in this case only a specific character, which does not occur in *I. fruticosus*, its nearest ally.

ISCHNOCHITON CARIOSUS, var. OCCIDENTALIS, Ashby.

Ischnochiton (Heterozona) cariosus, var. *occidentalis*, Ashby (Trans. Roy. Soc. S. Aust., vol. xlv., pp. 41-2, 1921).

Of this variety six examples were taken at 4 miles south of the homestead and at Surf Point, the southern extremity of the island. These all show the stronger sculpture characteristic of this variety, which the writer has now collected at the following localities on the western coasts of the western State:—Ellensbrook, Yallingup, Rottnest Island, Dongarra, Geraldton, and now as far north as Shark Bay on Dirk Hartog Island. The limits of the range of *I. cariosus* correspond with the limits proposed by the writer for his Indo-Australian Region, overlapping with the Adelaide Region (A. Ass. Adv. Sci., vol. 17, p. 374, 1924).

The largest of the Dirk Hartog Island shells measures 22 x 12 mm., this example showing none of the "large scales," although the next smaller in size exhibits this feature. Sufficient collecting has not been done along the southern coast of Australia to determine whether *occidentalis* deserves subspecific rank or whether it is only the extreme of a gradual variation.

ISCHNOCHITON TINDALEI Ashby.

Ischnochiton tindalei Ashby (Trans. Roy. Soc. S. Austr., vol. xlviii., p. 323-4, 1924).

Two examples were obtained of this shell, that has hitherto been only known from the damaged holotype from Groote Eylandt in the Gulf of Carpentaria; these two were obtained on rocks at low tide four miles south of the homestead.

This species is near to *I. luticolens* Hull, but is separable by the character of the sculpture and the more raised lateral areas; the granules in the lateral areas and end valves in *I. luticolens* are shallow and flattened, whereas in *I. tindalei* they are strongly convex; this character, although in a less degree, applies to the sculpture of the other areas; also, in *I. tindalei*, the grains are more crowded. The two examples from Dirk Hartog Island are hardly as strongly sculptured as is the type, this may be due to juvenility, or it may be that when a larger series is available sufficient variation in *I. tindalei* may be found to cause one to grant this form subspecific rank only. The two examples under discussion have not been disarticulated, so I cannot say whether they show the same distinction in the slitting of the insertion plate that was noticed in the holotype.

CRYPTOPLAX HARTMEYERI Thiele.

Thiele (Die Fauna Südwest-Australiens, Polyplacophora, Band iii., L. ii., pp. 405-6, 1911).

Dr. J. Thiele, in his description, records three examples collected by Drs. Michaelsen and Hartmeyer; one came from Surf Point, the southern extremity of Dirk Hartog Island, but the locality of the other two is unknown, probably also from Shark Bay. These three specimens have hitherto been the only examples known, and are, I understand, in the Berlin Museum.

I was successful in collecting two at Surf Point (the type locality), and one between that spot and the homestead, about four miles south of the latter. Those from Surf Point measure, respectively, dry, 45 and 25 mm. in length, and were taken off limestone or coral rock at low water, on the inner side of Surf Point on the island side (north) of the South Channel. The third example was found almost completely buried in the hole of some rock borer, in a piece of hard limestone, at four miles south of the homestead; the animal so completely filled the hole into which it had forced its way that it was with much difficulty got out without damage, and is now preserved in spirit. This example only measures, in its curled condition, 20 mm. in length, although really the second largest of the three taken. Valves 5, 6, and 7 are in this specimen as in life and show as mere spots, nearly buried in the spiculose girdle. I cannot distinguish between this and the figure in Reeve's Icon., 1847, *Chitonellus*, pl. i., fig. 3, which figure is understood to represent *C. burrowi* Smith.

Thiele, while admitting that *C. hartmeyeri* is nearly allied to *C. burrowi*, says "the valves and also the spicules on girdle are distinctly different," but it is unfortunate that he does not indicate the characters of these differences. Unfortunately, I have never seen an example of *C. burrowi*, neither have I seen drawings or descriptions of the characters of the girdle spicules of that species and, therefore, am not in a position to express any opinion. In 1924 (l.c. vol. xlviii, pp. 239-240) the writer described and figured a minute *Cryptoplax* from about 30 miles north of Carnarvon, North Shark Bay, suggesting that it might be identified with the still more minute form partially described by Thiele under the name *C. michaelseni*, in 1911. I now realize that, although the valve sculpture of this juvenile specimen from north of Carnarvon appears to differ considerably from adult *C. hartmeyeri*, the peculiar flattened, adpressed spicules, whose character was especially emphasised in my description in 1924 l.c., correspond exactly with those of *C. hartmeyeri*, of which I now have specimens. The fact that in the juvenile form all the valves touch one another, did not at all suggest that species, in which the last four valves are so widely separated, but now I am satisfied that this Carnarvon example is the juvenile form of *C. hartmeyeri*.

CRYPTOPLAX MICHAELSENI Thiele.

Thiele (Die Fauna Südwest-Australiens, l.c.p. 404, pl. vi., figs. 11-17).

I called Dr. Thiele's attention to the statement of Iredale and Hull: "That the Thielean figures here reproduced absolutely prove that Thiele's species is not a *Cryptoplax*." To this Dr. Thiele replies, under date June 25, 1928: "The foremost part (anterior valve) has three incisions (slits), all the rest are without them; in my opinion the species should be placed in *Cryptoplax*."

With the additional light thrown upon the subject by the discovery that the juvenile shell from north of Carnarvon is the juvenile stage of *C. hartmeyeri*, I have re-examined Thiele's figs. of his *C. michaelseni* and, if as seems probable, his specimen was one-third only the size of Ashby's Carnarvon shell, the figures would fairly well represent a juvenile shell of *C. hartmeyeri* of about 2 mm. in length. Also Thiele's figures of the spicules of the two species closely correspond with each other, if one allows for the extra magnification of the spicules

of *C. michaelsoni*, which is two to three times that of his figures of *C. hartmeyeri*. Thiele explains that he was quite unaware that the minute specimen he called *C. michaelsoni* was a *Cryptoplax* until the disarticulation of the valves revealed the fact that the insertion plates were those of a *Cryptoplax* and not those of an *Acanthochiton*, this probably accounts for the omission of full measurements of the animal.

In conclusion.—I have demonstrated that *C. hartmeyeri* possesses a specialized form of girdle spicule which is flat, adpressed, and grooved; that this peculiar form of spicule also clothes the girdle of Ashby's shell which he identified with *C. michaelsoni* Thiele, and now the additional study of Thiele's figures supports the assumption that the minute type of *C. michaelsoni* also possessed similar specialized girdle spicules. In face of these facts, we have to consider that these are different stages of growth of one species, and we have reached the following conclusions:—

- (a) That Iredale and Hull referred *C. michaelsoni* to the genus *Acanthochiton* without the slightest supporting evidence.
- (b) That Ashby's shell, which he identified with *C. michaelsoni*, is conspecific with *C. hartmeyeri*.
- (c) That *C. michaelsoni* is the very juvenile form of *C. hartmeyeri*.
- (d) Unfortunately, *C. michaelsoni* has page precedence over *C. hartmeyeri*, which, under International rules, necessitates our accepting *C. michaelsoni* Thiele, as the name of the shell, *C. hartmeyeri* becoming a synonym thereof.

LOPHOCHITON JOHNSTONI Ashby.

Lophochiton johnstoni Ashby (Trans. Roy. Soc. S. Austr., vol. xlvii., 233-6, 1923).

Iredale and Hull propose to recognise in this shell, *Chiton coccus* Menke, a species that was never figured and the type of which was lost. Menke's description will equally apply to Hull's *Callistochiton granifer*, to Thiele's *Callistochiton recens*, or almost any *Callistochiton*. *C. recens* Thiele was described from Shark Bay in 1911, *L. johnstoni* Ashby from same locality in 1923, and *L. granifer* Hull described as a *Callistochiton* from Queensland, also in 1923, but publication of his name precedes Ashby's by a few months.

I prefer to follow Pilsbry and relegate *C. coccus* Menke to the list of "Insufficiently described chitons, and species of unknown generic position." Thiele's *C. recens* was not figured but, as the type is still in existence, I sent one valve of the holotype of *L. johnstoni* and the single example taken by the writer on pearl-shell, dredged in Shark Bay, during the trip, also a specimen of Hull's *granifer* for comparison with Thiele's type. He writes me as follows:—"My *Callistochiton recens* appears to differ from the *Lophochitons granifer* and *johnstoni* in the weaker sculpture and the relatively broader and shorter middle valve, without noticeable radiable ribs."

I only secured the single example off pearl-shell that had been dredged in the bay between Dirk Hartog Island and the mainland; my opportunity of examination was limited to about half an hour, more available time would probably have led to further discovery. The specimens obtained 11.5 x 8 mm., the radial ribbing in the anterior valve is shallower than in *L. granifer*, as are also the two radial ribs in the lateral areas.

In conclusion.—A reference to the description of the type (p. 236) will show that the writer separated *L. johnstoni* from *C. recens*, not on lack of correspondence but on the existence in *L. johnstoni* of several striking characters unmentioned by Thiele, the most important of which was the absence of "festooning" in the insertion plate of the anterior valve, a feature that is present in the genus

Callistochiton; as Hull overlooked the absence of this feature in his description of his *granifer*, it is not impossible that Thiele did the same. Now, in comparing the examples sent, Dr. Thiele only mentions as separating characters in his shell, "weaker sculpture and the relatively broader and shorter middle valve." In respect to sculpture, I have already shown herein that the sculpture of *johnstoni*, especially in the ribbing of the lateral areas in the recent example, is much weaker than *L. granifer*; in fact, unless viewed with lateral lighting, the existence of radial ribbing in the lateral areas is imperceptible.

With regard to the proportional longitudinal and lateral measurements, these vary greatly in the median valves of Ashby's type, the single valve sent to Dr. Thiele was longitudinally considerably longer than any of the others; this will account for the apparent difference noted by Thiele. If Thiele's *C. recens* is without "festooning" in the insertion plate of the anterior valve it is certainly a *Lophochiton*, and coming, as it does, from the same locality, namely Shark Bay, both it and Ashby's *L. johnstoni* may safely be considered conspecific. As a result of this discussion we have:—

- (a) *Solviga recens* Thiele of Iredale and Hull becomes *Lophochiton recens* Thiele; their genus *Solviga* has no known Australian representative, even if it has any justification at all.
- (b) Ashby's *Lophochiton johnstoni* becomes a synonym of *Lophochiton recens* Thiele, as was rather anticipated in his type description.
- (c) *Callistochiton granifer* Hull becomes a very good subspecies of *Lophochiton recens* Thiele.

TONICA (LUCILINA) DILECTA Thiele.

Lucilina dilecta Thiele (Die Fauna Südwest-Australiens, iii., p. 397, 1911).

No adequate characters of generic values seem to have been advanced to justify generic separation of *Lucilina* from *Tonica*, but with some hesitation I am retaining *Lucilina* as having subgeneric status.

Three small specimens were taken off the rocks at low tide four miles south of the homestead, and over a dozen from the same heap of pearl-shell that had been dredged in deeper water, that has before been referred to, these all will be topotypes, as Shark Bay is the type locality. The smallest example, 5 mm. in length, is worthy of mention, it was from the rocks four miles south of the homestead, is of a beautiful pink colour mottled with lighter and darker markings, is much longer in proportion to width than usual, and the lateral areas are strongly raised, showing little if any of the typical sculpture.

Onithochiton quercinus occidentalis, n. sub-sp.

A new name for the *Onithochiton* from Western Australia = *O. scholviene* Thiele (Die Fauna Südwest-Australiens, iii., p. 1, 1911. Non of Thiele Rev. Chitonen, Chun's Zool. Heft 56, pl. ii., 1910).

Dr. Thiele writes me under date June 25, 1928, in reference to well-preserved examples of this *Onithochiton* I sent him from the north of Shark Bay:—"The small *Onithochitons* from Carnarvon I consider, because of their weak sculpture, not to be *O. scholviene*, which species, as I have written before, comes from Vaucluse, and also from Sydney." *O. scholviene* Thiele is, therefore, a synonym of *O. quercinus* Gould, as there is only one species known in that locality.

The known range of *O. quercinus* extends from south of Sydney, in New South Wales, to Mackay, in Queensland. The known range of the Western Australian species extends from Esperance on the South coast, up the west coast to a spot half way between Carnarvon and Maud Landing. This leaves a gap

around the coastline (not following the indentations) of 1,200 miles in Western Australia, 1,100 miles in the Northern Territory, and 1,500 miles in Queensland, or approximately 3,800 miles of coastline between the habitats of the two forms, throughout which immense area of coast, up to the present, we have no knowledge of the presence of either of these species. This fact, combined with the general difference of sculpture, leads one to conclude that we are justified in recognising the western form as at least deserving subspecific separation.

Differences.—I concur in the main with Dr. Thiele in his statement that the western form is weaker than its congener in the east, but I admit, with Iredale and Hull, that very wide variation exists on the eastern species, but on the other hand the western species, in the adult stage, with rare exceptions, is much less sculptured than is the eastern form; in fact, normally the lateral areas in the western are almost, if not quite, unsculptured. Again, the western, which I propose to call *occidentalis*, normally attains a larger size; in fact, the large examples are much the most common. An examination of the respective girdles under 65 mag. leads me to conclude that while the girdles of both forms are densely clothed with shortish, stout, pointed spicules, those on the eastern shells are shorter and stouter in proportion, and also that *O. quercinus* s.s. normally possesses, amongst others, one particular class of spicule that does not occur in *occidentalis*, namely, very short, very stout spicules, usually placed in considerable patches; these spicules either taper abruptly to a fine point or have rounded, knobby apices; these rounded spicules suggest that the fine point has been broken off at an early stage and then mended by a redeposition of calcareous matter making a well-finished rounded apex, but I doubt whether this is a true explanation of the occurrence.

This *Onithochiton* was very common on the exposed western side of the reef at Surf Point, Dirk Hartog Island. I have selected as the holotype of this subspecies an example collected by myself at Dongarra, Western Australia, on November 10, 1920, taken from the exposed outer reef.

LILOPHURA HIRTOSUS (Peron M. S.) Blainville.

Chiton hirtosus Blainville (Dict. Sci. Nat., xxxvi., 1825).

Clavarizona was proposed as a generic name for the reception of this species by Hull (Aust. Zool., iii. p. 199, 1923). Ashby in (Jour. and Proc. Roy. Soc. W. Austr., vol. viii., pp. 32-3, 1921-2) shows that *L. hirtosus* is typically a *Liolophura*, and gives a detailed description of the insertion plate of the tail valve. The characters defined by Hull as justifying his proposed creation of his genus *Clavarizona* are certainly beneath generic status and, therefore, the generic name of *Clavarizona* cannot be accepted. This species was exceedingly numerous on the outer side of the bar at Surf Point, in the same rock holes as the *Onithochiton*.